

Control of **Radioactive Liquid Wastes** *in Pennsylvania*

KARL M. MASON, M.P.H.



On September 12, 1957, the Sanitary Water Board of the Pennsylvania Department of Health authorized issuance of a permit to the Duquesne Light Company for the treatment and discharge of liquid wastes from the company's steam turbine power plant employing heat exchanged from a nuclear reactor, at Shippingport. Located on the Ohio River some 25 miles from Pittsburgh, this power reactor is the first such installation in this country with disposition of its waste materials regulated by a State health agency.

When, in early 1954, it became certain that the first commercial power reactor was to be constructed in Pennsylvania, the State department of health and its water pollution control agency, the Sanitary Water Board, looked to their responsibilities. Despite the indecision at the time concerning the jurisdictions of the

Atomic Energy Commission and State agencies, the State health department elected to apply its authority under its general health powers to the adoption of radiation protection regulations. In addition, the Sanitary Water Board classified radioactive liquid wastes as industrial wastes, thus requiring a permit for discharge of any such wastes to the waters of the Commonwealth.

With the assistance of the Radiological Health Branch of the Public Health Service, the technical staff of the bureau of environmental health developed the conditions under which these liquid wastes could be discharged. As a result of the cooperation and competence of officials of the Duquesne Light Company and Westinghouse Electric Corporation, early agreement was reached on the radioactivity limits deemed necessary for the protection of the public health. The company, in its application report, had adhered to the maximum permissible concentrations recommended in Handbooks 52 and 61 of the Bureau of Stand-

Mr. Mason is the director of the bureau of environmental health, Pennsylvania Department of Health.

ards and the requirements of the health department's Radiation Protection Regulation. However, as indicated by the permit accompanying this article (p. 898), in the interest of public health protection, more stringent requirements were incorporated into this document than are recommended by national authorities.

The Reactor and Its Wastes

The Shippingport atomic power station is designed to produce electric energy by a conventional turbine-generator unit. The first reactor core has a rating of 231 megawatts heat, producing a 60-megawatt net electrical output. Subsequent cores will have ratings up to 340 megawatts heat and 100 megawatts gross electrical output. Steam for the turbine is supplied by the primary plant, consisting of the nuclear reactor and its associated systems. This plant is comparable to the furnace and boiler of a conventional power station.

The pressurized water reactor consists of a closed system in which water at high pressure is circulated over an array of nuclear fuel elements (the core) to heat exchangers where steam is formed in a separate, isolated system. The active portion of the nuclear core is a cylinder about 6 feet in diameter and 6 feet high containing highly enriched uranium assemblies (called seed) and natural uranium assemblies (called blanket). The seed assemblies contain a total of 75 kilograms of enriched uranium-235, and the blanket contains 14 tons of natural uranium metal in the form of UO_2 .

The radioactive wastes are classified into eight categories: reactor plant effluents, service building wastes, fuel canal water wastes, spent ion-exchange resin and incinerator ash wastes, combustible solid wastes, noncombustible solid wastes, gaseous wastes, and boiler water. The three main sources of radioactivity which contribute to the liquid wastes are:

1. The activation of corrodible metals, corrosion products, and trace elements in the high-purity reactor coolant water.
2. Fission products released from failed fuel elements.
3. Tritium resulting from activation of the lithium hydroxide added to the reactor coolant water to minimize corrosion in the system.

It is estimated by the company in its report that only about 2.5 percent of the total radioactivity will be discharged to the river. Most of the remainder will be retained in the spent ion-exchange resin storage tanks (97.4 percent); a minute percentage will be discharged as gas to the atmosphere (0.01 percent).

In order to insure that the required degree of treatment is provided, the liquid wastes are sampled and the level of radioactivity determined at each stage of the treatment process. During a long period of retention in underground storage tanks the radioactivity is reduced appreciably by decay, and subsequent processing through the ion-exchangers reduces further the radioactivity of these wastes. Thus, the entire treatment is a series of batch processes prior to discharge to the river, and the wastes may be reprocessed if the samples indicate that the required reduction in radioactivity has not been accomplished. The high-level radioactive wastes which are retained in the ion-exchanger are held for disposition by burial elsewhere at locations supervised by the Atomic Energy Commission.

Safety Factors

The accepted standard applied to the discharge of liquid wastes to streams utilized for public water supplies is that the radioactivity for unknown mixed fission products shall not exceed an annual average of 1×10^{-8} microcuries per milliliter above natural background radioactivity at the next point of use downstream. To provide extra protection for the waters traversing Pennsylvania and to retain a portion of the stream flows for the discharges from future nuclear facilities, several safety factors were added to this standard.

As an example, the sampling point for Shippingport wastes is in the plant's effluent channel containing the condenser cooling water. This location results in an extra safety factor of more than 100 since the maximum amount of condenser cooling water is less than 1/100 of the mean flow of the Ohio River. Another appreciable factor of safety is that the limits of radioactivity apply at any time, rather than to the average concentration over an interval

of 1 year. These same conservative requirements have been incorporated in the permits issued to six other nuclear facilities of various types and will be applied to several applications now under consideration.

In considering the application of the Duquesne Light Company, one of the initial counterproposals of the Pennsylvania Department of Health was that the company reduce substantially its request for an emergency discharge of 700 curies of tritium in 1 day should an accident occur in any of the coolant loops. Although this amount of tritium was below the maximum permitted by accepted standards for an average concentration over an entire year, the company agreed to withdraw this proposal and limit the maximum discharge of tritium during any 1 day to less than 1 percent of the maximum allowable concentration. This agreement is consistent with the objective of the department of health and its Sanitary Water Board to produce and discharge the least amount of radioactivity practicable. Recent analyses of waste discharges from the Shippingport plant indicate that it will be possible to conform to the stringent standards for fission products as well as for tritium.

During 1956 and 1957 the Westinghouse Electric Corporation conducted, under the sponsorship of the Atomic Energy Commission, a site-monitoring program in the vicinity of the Shippingport plant. The purposes of the preoperational phase of this program were to determine the types and amounts of radioactive materials which occur in the environment around the reactor plant and to determine the variations in the amounts of these materials over a period of approximately 1½ years prior to operation. Analyses were made on (a) soil in the general vicinity of the plant, (b) Ohio River water above and below the site, (c) well water within a 1-mile radius, (d) vegetation in this general area, and (e) the air in the general area.

Although the department of health accepted the reports of Westinghouse's study and assisted in some of the sampling, it decided to initiate further studies in the area in order to encompass all phases of the environment sub-

ject to possible contamination by radioactivity. Through the efforts of the department's public health veterinarian, specimens of animal life and milk products have been collected and analyzed for radiation levels, both in the general area of the plant and in a control area. Using Federal program grant funds, the department has contracted with the University of Pittsburgh to determine the radioactivity levels of all types of aquatic life in the Ohio River above and below the plant site. Since both the department of health and the Duquesne Light Company are continuing the site-monitoring programs on a postoperational basis, data will be available on all of the environmental aspects which could be affected by nuclear facilities in this area.

Summary

Public health authorities in Pennsylvania are administering a program of radioactive liquid waste control in the following manner:

1. Radioactive liquid wastes have been classified as industrial wastes and thus are subject to a permit from the Sanitary Water Board.
2. Since the treatment processes employed at such installations have not been subject to full-scale operation experience, the permits are granted on an experimental basis.
3. For the purpose of insuring protection of the public health and the retention of stream volumes for future discharges, the levels of radioactivity in liquid wastes must conform to more stringent standards than those generally accepted.
4. The conditions of the permit, including the maximum allowable concentrations, are subject to revision if altered conditions or the advance of science and technology so indicate.
5. The discharge of radioactivity shall be kept at the most practicable minimum, regardless of maximum amounts permissible.
6. Adequate analyses and operational reports must be submitted to the department of health.
7. Environmental monitoring programs shall be continued and, if necessary, expanded.
8. Immediate notification of the department is required in the event of accident or discharge in excess of tolerance.

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF HEALTH

SANITARY WATER BOARD

HARRISBURG

INDUSTRIAL WASTES PERMIT NO. 1832

The Sanitary Water Board, which by virtue of the Act of April 9, 1929, P. L. 177, known as The Administrative Code of 1929, and the amendments thereto, and of the Act of June 22, 1937, P. L. 1987, as amended by the Act of May 8, 1945, P. L. 435, is empowered to exercise certain powers and perform certain duties "To preserve and improve the purity of the waters of the Commonwealth for the protection of public health, animal and aquatic life, and for industrial consumption, and recreation; . . .", hereby issues this permit to the Duquesne Light Company, 435 Sixth Avenue, Pittsburgh 19, Pennsylvania, its successors or assigns, approving, subject to certain conditions, the proposed works for the treatment of wastes from the permittee's atomic (nuclear reactor-steam turbine) power plant located in Shippingport, Beaver County, Pennsylvania, with discharge of the treated effluent therefrom into a channel of the Ohio River between its left, or southern, bank and Phillis Island, about 11 miles below the confluence of the Beaver River, in response to an application, undated but attested June 19, 1957.

This plant is designed for the production of 60 megawatts, i. e., 60,000 kilowatts of electrical energy during initial operation. Later, possibly after about a year, and when the present core has been replaced by a more powerful one, the plant is expected to reach a maximum rating up

to 340 megawatts of heat and 100 megawatts gross electrical output.

This application requests approval of "the discharge to the Ohio River of an average of 12,000 gallons per day of waste water containing approximately 10 curies of tritium and 1,590 microcuries of other radioactive materials. This effluent consists, for the most part, of laundry and shower room wastes and neutralized laboratory wastes which are released to the condenser effluent stream at a controlled rate. The lesser portion of the discharge consists of reactor plant wastes. The system consists of gravity collection tanks; intermediate storage and decay tanks; processing by evaporator, ion-exchangers, gas stripper; followed by controlled discharge to the river. Radioactivity is measured at each stage of the process and before discharge." It is to be noted that the term "neutralization," as used above, refers only to chemical neutralization.

The proposed plant and waste treatment works will provide for batch treatment of all wastes. If in the opinion of the Sanitary Water Board, any wastes are inadequately treated, facilities will be available for recycling such wastes through all or parts of the treatment process until the effluent is satisfactory for discharge to the waters of the Commonwealth when diluted with the normal volume of cooling water. The proposed works are described in

some detail in an engineering report entitled "Duquesne Light Company—Shippingport Atomic Power Station—Shippingport Borough—Beaver County, Penna.—April 20, 1957" and are shown on twelve sketches and diagrams bound with the report and entitled and described as follows:

Artist's Conception of the Shippingport Atomic Power Station.

Figure 1. Duquesne Light Company—Territory Served and Location of Principal Facilities—December 31, 1955—No. SP-507.

Figure 2. Shippingport Power Station—Duquesne Light Company—Plan Showing General Arrangement.

Figure 3. (This is an isometric drawing, diagrammatic, showing the reactor and four main coolant loops.)

Figure 4. PWR Reactor Vessel.

Figure 5. (These are enlarged detail sketches of reactor core, seed and blanket assembly, fuel rods, etc.)

Figure 6. Seed Assembly Cross Section.

Figure 7. PWR Fuel Rod Exploded View.

Figure 8. Reactor and Steam Plant—Plan View.

Figure 9. Radioactive Waste Disposal System—Plot Plan.

Figure 10. Radioactive Waste Disposal System (flow sheet).

Figure 11. Shippingport Power Station—Area Survey Stations. . .

Also bound with the company's report are two tables, "Table I—Expected Maximum Steady-State

Activity For Non-Volatile Fission Products in the PWR Wastes—Duquesne Light Company—Shippingport Atomic Power Station” and “Table II—Activity Discharged to River—Waste Disposal System—Duquesne Light Company—Shippingport Atomic Power Station.”

The report and plans were prepared by J. A. Tash, Eng., Power Stations Dept. of the Duquesne Light Company. The report is signed by W. J. Lyman, a professional engineer, Pennsylvania Registry No. 5582, Vice-President, Operations Division, Duquesne Light Company, and stamped as received in the Pennsylvania Department of Health, Division of Sanitary Engineering, Region III, on June 21, 1957.

These plans are hereby approved subject, nevertheless, to the condition that the waste treatment plant to be constructed under said plans will produce an effluent satisfactory to the Sanitary Water Board. By this approval, neither the Board nor the Commonwealth of Pennsylvania assumes any responsibility for the feasibility of the plans or the efficiency of the operation of the plant to be constructed thereunder.

This permit is issued subject to the following Special Conditions:

A. The waste treatment facilities shall be constructed and ready for operation coincident with the start of power operation of the reactor.

B. Approval of plans refers to waste treatment and not structural stability, which is assumed to be sound and in accordance with good structural design. Failure, because of faulty structural design or poor construction, of the works herein approved will render this permit void.

C. Since the herein approved works employ principles not at present considered conventional, they must be regarded as *experimental* and the subsequent action of the Sanitary Water Board will depend on actual performance in eliminating the objectionable characteristics of the waste waters as discharged from the works in question.

D. The discharge of untreated or improperly treated industrial wastes to the waters of the Commonwealth

is contrary to the requirements of the Sanitary Water Board. If, because of accidental breakdown of the treatment works or plant equipment or for any other reason, any such discharge should occur, then the operation of any process producing such discharge shall be discontinued until repairs to the treatment works or other satisfactory measures to prevent stream pollution shall have been completed.

E. The permittee is hereby directed to immediately notify the Pennsylvania Department of Health whenever there is a spill or an accidental discharge of radioactive material and shall advise that Department promptly concerning the pertinent facts and probable danger. The permittee shall maintain rosters of Pennsylvania Department of Health personnel and of downstream users of river water who shall be notified. The necessary information for such rosters shall be furnished to the permittee by the Department of Health. In the event of any such accidental discharge, the Department of Health shall determine whether or not downstream users shall be notified, and by whom.

Moreover, the permittee is required to see to the training and supervision of all operating personnel, in order to prevent the discharge of such material, fluid or solid, to the waters of the Commonwealth or to the site, without adequate treatment.

F. All industrial wastes discharged to the portion of the Ohio River on which the permittee's plant is located shall meet at least the requirements of the Sanitary Water Board for primary treatment. “Primary treatment” does not apply to the radioactive characteristics of the wastes.

The term “primary treatment,” as here used, is such treatment of sewage as, in the opinion of the Board, will remove practically all of the settleable solids; will remove at least 35 percent of the organic pollution load as measured by the biochemical oxygen demand test; will accomplish the removal of oils, greases, acids, alkalis, toxic, putrescible, taste- and odor-producing

substances, and other substances inimical to the public interest in the receiving stream; will provide effective disinfection to control disease-producing germs; will provide for satisfactory disposal of sludge; and will produce a final effluent that is suitable for discharge into the receiving stream. “Primary treatment of industrial wastes,” as here used, is treatment to a degree equivalent to that set forth herein for sewage.

Moreover, because of the radioisotopes which these wastes may carry, such wastes shall be substantially free of turbidity and suspended solids over and above the amounts of such characteristics in the intake water.

G. The treated radioactive liquid wastes as discharged to the Ohio River shall comply with the Pennsylvania Department of Health Radiation Protection Regulation 433 and any subsequent regulations of the Department of Health.

H. With respect to the amount of radioactivity released in the liquid wastes to the waters of the Commonwealth, this permit is issued subject to the following conditions: (1) that the average radioactivity, exclusive of tritium activity, of these wastes over any consecutive 365-day period shall not exceed 1,590 microcuries per day, with the maximum discharge not exceeding 6,200 microcuries per day, (2) these wastes shall at no time carry more radioactivity, exclusive of tritium activity, than 10^{-8} microcuries per milliliter in excess of that of the plant intake water from the Ohio River, and (3) that the discharge of tritium in these wastes shall be not more than 10 curies per day averaged over any consecutive 365-day period, nor more than 50 curies per day maximum. Moreover, the company shall conduct all its pressurized water reactor operations so as to produce and discharge the least practicable amounts of radioactivity.

I. Although tritium has a short biological half-life (19 days) and a maximum permissible concentration (MPC) of 0.2 microcuries per ml. (according to Handbook 52 of the National Bureau of Standards) as compared with an MPC of 10^{-8} micro-

curies per milliliter for the general population for unidentified isotopes, its radiological half-life is long enough (4,600 days) to make its continued presence in the stream undesirable and possibly inimical to aquatic and other life. At the present time, it is reported, there are no practical means for its separation from a liquid. The permittee, however, shall continue to investigate and apply more effective means to remove this potential hazard as rapidly as such means are developed, or attempt to devise some other means or to attempt to find some other substance which will have advantages similar to that of lithium hydroxide without producing the present discharge of tritium. The attention of the permittee is directed to the possibility that tritium may prove objectionable as a constituent of water used for certain industrial processes.

J. The radioactive and other liquid wastes discharged to the effluent channel shall be well admixed with the cooling water so that the waste content of this channel shall be substantially uniform below the effluent weir or at the sampling rake.

K. The treated effluent shall be discharged to the river in a manner acceptable to the Sanitary Water Board. If any structure is necessary to accomplish this, it shall be well protected against the effects of flood waters, ice, and other hazards and the design of such structure shall be acceptable to the Sanitary Water Board.

L. Provision shall be made for regulating the discharge of the treated effluent so that it shall be equally distributed over the longest practicable period, in order that advantage may be taken of maximum possible dilution by the receiving stream, and means to accomplish uniform 24-hour distribution shall be provided if in the opinion of the Department of Health this shall be found necessary.

M. The wastes after treatment and prior to discharge to the effluent channel shall contain no more than 0.05 p.p.m. of hexavalent chromium and 1.0 p.p.m. of trivalent chromium.

N. The permittee shall provide means for measuring the total volume as well as variations in the rate of discharge of all waste water. Equipment to automatically record this information shall be provided promptly if directed by the Department of Health.

O. Any solid waste material including radioactive material shall be so handled that a nuisance is not created, and shall be disposed of in a safe and sanitary manner to the satisfaction of the Department of Health and in accordance with the provisions of the Pennsylvania Department of Health Radiation Protection Regulation 433 and any subsequent regulations of the Pennsylvania Department of Health.

P. It is required that a sampling schedule be maintained and that records thereof be kept together with records of the operation of the waste disposal system, and that such data be submitted in reports to the Department of Health, covering such particular matters and at such intervals as the Department may direct, beginning within two months after the initial operation of the plant. It is noted that the report submitted with the present application indicates that records will include:

1. Accumulation rate and activity for each class of waste by days.
2. Changes in activity of wastes during processing.
3. Volume and activity of waste discharged.
4. Time of day and duration of discharge with volume and activity automatically recorded.

The special nature of the wastes produced at the permittee's Shippingport plant may cause the Sanitary Water Board to require additional sampling, analysis, and testing of the surface and underground waters in the vicinity, particularly of the Ohio River at points above and below the plant, in order to determine the effects of radioactivity on these waters.

The report submitted to the Board by the permittee, in support of its permit application, indicates that such sampling is being conducted at present by or under the sponsorship

of the U. S. Atomic Energy Commission. If for any reason, however, the AEC does not continue this sampling, or if in the opinion of the Sanitary Water Board additional data are needed, the permittee may be required to conduct such sampling and analysis as the Board may direct.

Q. Acknowledgment is made of the company's study now in progress to determine temperatures and percentage of river volume that flows through a narrow river channel between Phillis Island and the mainland to determine the expected rise in river water temperature in this channel when the condenser cooling water is discharged to it. The permittee is hereby advised that the river water temperature rise is tentatively limited to 2° F. at points to be determined by the Sanitary Water Board after the results of the thermal studies of the channel and of other data have been reviewed, and that if this limit cannot be maintained with the proposed method of discharge, then complete dispersal of the condenser effluent in the river, or other means for temperature control, may be necessary. The report on the river channel study shall be submitted in duplicate to the Sanitary Water Board within 60 days of completion of the study which is expected to terminate in the last months of 1958, with progress reports on a quarterly basis.

R. The permittee shall submit to the Sanitary Water Board a comprehensive report on the operation of the herein approved treatment works within six weeks after completion of the first half-year of operation, and within a similar period of time subsequent to any substantial change in the operating capacity of the plant or any other marked change in operation or waste treatment. The report shall include pertinent information as to waste volumes, radioactivity before and after waste treatment, the general adequacy of these works in treating all waste discharges from this establishment so as to meet the requirements of the Sanitary Water Board for primary treatment, an overall estimate of the success achieved in (1) the

reduction of the pollution carried to the stream and (2) in the continuous maintenance of a final liquid effluent meeting the requirements of the Board as to uniform admixture with the cooling water.

S. If the effluent as produced by the waste treatment works herein approved shall in the opinion of the Sanitary Water Board prove to be of quality unsatisfactory for discharge into the receiving stream, by reason of the creation of a public nuisance, or because of change in the character or volume of the wastes, or in the use or condition of the receiving stream, or for other reason; or because in the Board's opinion such discharge is or may become inimical or injurious to the public health or to animal or aquatic life or to the use of the receiving body of water for domestic or industrial consumption or for recreation, then a higher degree of treatment (by means of additional plant units or otherwise) shall

be provided. Plans for additional works shall be prepared promptly after notice from the Board so to do, and after approval of the plans by the Board, the additional treatment shall be provided and placed in operation within such time as the Board shall require. No construction shall be undertaken without such approval.

T. This permit will be subject to review from time to time by the Sanitary Water Board, and to change if so indicated by altered conditions or the advance of science and technology.

And this permit is further subject to the following numbered Standard Conditions of "Standard Conditions Relating to Industrial Wastes" effective January 1, 1941, attached hereto: 1, 2, 3, 6, 7, 13, 16, and 17.

[NOTE: These standard conditions require adherence to prior permits or orders, compliance with the approved construction plans and with

the established effluent standards, adequate supervision during construction, notification of the department of health when construction is completed, proper maintenance of treatment facilities, and permission from Federal authorities for the installation of stream structures.—
EDITOR]

This permit is issued in response to an application (No. 12234-IW) filed in the Harrisburg office of the Pennsylvania Department of Health on the 22d day of June A. D. 1957, and in accordance with the authorization given by the Sanitary Water Board at its meeting on September 12, 1957.

SANITARY WATER BOARD
By: BERWYN F. MATTISON, M.D.,
Secretary of Health, Chairman
Attest: JOHN W. GITTINS,
Secretary

HARRISBURG, PENNSYLVANIA,
November 1, 1957

Tuberculosis Casefinding in Schools

The Public Health Service, the Office of Education, and the Children's Bureau have suggested that school and college officials and health departments assess existing tuberculosis casefinding programs among students and employees in the light of the recent official statement of the Public Health Service on X-ray Casefinding Programs in Tuberculosis Control, published in *Public Health Reports*, January 1958.

The Committee on Health of the School Age Child, a joint body of the three agencies of the Department of Health, Education, and Welfare, has made these recommendations:

1. Tuberculosis casefinding programs for children, youth, teachers, and other school personnel should be evaluated and planned in the light of current knowledge concerning the prevalence of tuberculosis and the effects of radiation on the human organism. Profes-

sional assistance and advice should be sought from the appropriate State or local health department.

2. Laws and regulations that make periodic chest X-ray examinations compulsory for students, teachers, and other school personnel should be reviewed and modified if necessary to allow health authorities to select the most effective current methods and to utilize applicable new knowledge and techniques of tuberculosis control.

3. Consideration should be given to the use of the tuberculin test as the initial screening device to be followed by a chest X-ray of reactors. The percentage of reactors in some school and teacher populations is low enough to make this a practical procedure.

4. X-ray equipment should be periodically checked and adequate safeguards applied to protect all persons from unnecessary radiation.

Nursing Care for Hemiplegic Patients

Nursing care of hemiplegic patients, the victims of stroke, occupied the 1958 seminar in cardiovascular nursing conducted by the Heart Association of Southeastern Pennsylvania in Philadelphia last February.

The proceedings published by the association consist of papers describing the nature, needs, and management of the condition.

More than a million Americans suffer hemiplegia, said Dr. William J. Erdman II of the University of Pennsylvania School of Medicine. Attacks, resulting from a block of the brain's blood supply, occur at any age. Effects may include a loss of consciousness; flaccid paralysis, usually up to a few days; spasticity in the flaccid area; inability to communicate, although hearing and understanding may be unimpaired; inability to judge what is vertical; loss of the sense of touch; and a painful shoulder.

Dr. Erdman recommended an optimistic attitude, which can be communicated to the patient by explaining the prospect for recovery; accepting the patient's limitations without criticism; drawing favorable attention to each sign of recovery; encouraging patients to do as much for themselves as they are able, without posing tasks so formidable as to discourage them; and encouraging hobbies or employment for the homebound. Although progress is slow, he said, 4 out of 5 patients regain ability to take care of personal needs.

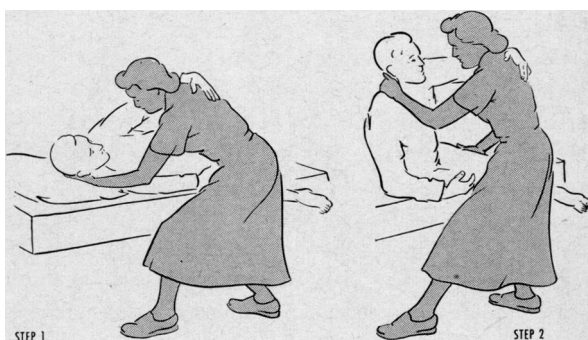
Vera Ford Powell of the Albert Einstein Medical Center's home care program offered specific advice to nurses. The attitudes of the family and the patient must be understood if therapy is to be effective, she said. "The patient is frightened, anxious, and angry. There is never consistency in the cooperation of a patient. The family develops attitudes of pity, hostility, and rejection. Too much help is not good for the patient."

For the nursing of an aphasic (speechless) patient, she advised a relaxed attitude; a calm, friendly, and secure atmosphere; acceptance of the patient's inability to talk; and acceptance

of the tendency of the patient to resort occasionally to infantile language or to vile outbursts. She warned nurses not to anticipate what the patient is trying to say, not to say it before the patient has expressed it in full. Recovery, she emphasized, proceeds from tactfully but persistently encouraging the patient to say basic words and perform essential movements in all activities of the day.

Occupational therapists, physical therapists, and others participated in the meeting, which included discussions of self-help devices for the partially paralyzed.

Strike Back at Stroke



GETTING OUT OF BED

A major obstacle in management of stroke patients has been a problem of communication between physician and the patient's family. The above illustration is typical of those used, with appropriate legends, in a new Public Health Service publication, *Strike Back at Stroke*, to explain how to move and exercise stroke victims. The book contains 21 therapeutic exercises and is arranged so that the physician can prescribe for the patient's specific needs.

Demands for this publication have been such that the first edition was sold out before it was announced in *Public Health Reports* in August. Health departments are distributing copies to physicians.

To prepare the illustrations in this book, approximately 250 photographs were taken of the more typical procedures used in treating hemiplegic patients. Drawings were made from the photographs selected by a group of consultants who assisted in the development of the book.